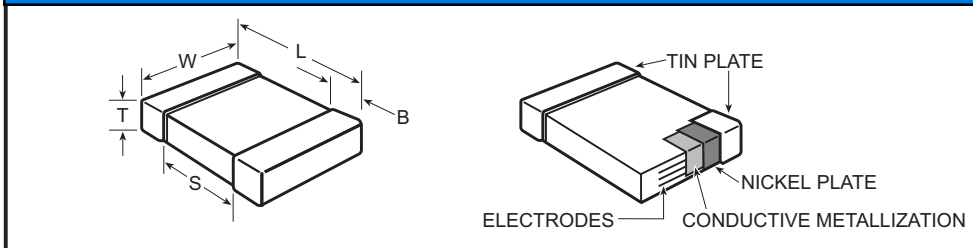


**Surface Mount Ceramic Chip Capacitors – X7R Dielectric - Capacitance Extensions**

**Outline Drawing**



**Dimensions – Millimeters (Inches)**

| EIA Size Code | Metric Size Code | L Length                 | W Width                  | B Bandwidth               | S Separation |
|---------------|------------------|--------------------------|--------------------------|---------------------------|--------------|
| 0402          | 1005             | 1.0 (.039) ± 0.05 (.002) | 0.5 (.020) ± 0.05 (.002) | 0.20 (.008) ± 0.4 (.016)  | 0.3 (.012)   |
| 0603          | 1608             | 1.6 (.063) ± 0.15 (.006) | 0.8 (.032) ± 0.15 (.006) | 0.35 (.014) ± 0.15 (.006) | 0.7 (.028)   |
| 0805          | 2012             | 2.0 (.079) ± 0.02 (.008) | 1.25 (.049) ± 0.2 (.008) | 0.5 (.020) ± 0.25 (.010)  | 0.75 (.030)  |
| 1206          | 3216             | 3.2 (1.26) ± 0.2 (.008)  | 1.6 (.063) ± 0.2 (.008)  | 0.5 (.020) ± 0.25 (.010)  | -            |
| 1210          | 3225             | 3.2 (.126) ± 0.2 (.008)  | 2.5 (.098) ± 0.2 (.008)  | 0.5 (.020) ± 0.25 (.010)  | -            |

See Capacitance Value Table below for thickness dimension.

**Capacitor Ordering Information**

**C 0603 C 105 K 4 R A C**

**Style** \_\_\_\_\_  
C - Ceramic

**Size Code** \_\_\_\_\_  
See dimension table

**Specification** \_\_\_\_\_  
C - Standard

**Capacitance Code, pF** \_\_\_\_\_  
First two digits represent significant figures.  
Third digit specifies number of zeros. 100 pF = 101.  
(Use "9" for 1.0 through 9.9 pF)  
(Use "8" for 0.1 through .99 pF)

**Capacitance Tolerance** \_\_\_\_\_  
K = ± 10%    M = ±20%

**End Metallization**  
C = Standard (Tin-plate nickel barrier)

**Failure Rate Level**  
A = Not Applicable

**Temperature Characteristic**  
Designated by Capacitance Change Over Temperature Range  
R = X7R (±15%) (-55°C +125°C)

**Voltage**  
9 = 6.3V    8 = 10V    4 = 16V  
3 = 25V    5 = 50V

| Capacitance Value                   |                   |         |                       |                               |             |              |
|-------------------------------------|-------------------|---------|-----------------------|-------------------------------|-------------|--------------|
| Capacitance Value ( $\mu\text{F}$ ) | KEMET Part Number | Voltage | Capacitance Tolerance | Thickness                     | Qty 7" Reel | Qty 13" Reel |
| 0.022                               | C0402C223_3RAC    | 25      | K, M                  | 0.5 (.020) $\pm$ 0.05 (.002)  | 10,000      | 50,000       |
| 0.022                               | C0402C223_5RAC    | 50      | K, M                  | 0.5 (.020) $\pm$ 0.05 (.002)  | 10,000      | 50,000       |
| 0.047                               | C0402C473_3RAC    | 25      | K, M                  | 0.5 (.020) $\pm$ 0.05 (.002)  | 10,000      | 50,000       |
| 0.15                                | C0603C154_5RAC    | 50      | K, M                  | 0.8 (.032) $\pm$ 0.15 (.006)  | 4,000       | 10,000       |
| 0.22                                | C0603C224_3RAC    | 25      | K, M                  | 0.8 (.032) $\pm$ 0.15 (.006)  | 4,000       | 10,000       |
| 1                                   | C0805C105_3RAC    | 25      | K, M                  | 1.25 (.049) $\pm$ 0.20 (.008) | 3,000       | 10,000       |
| 0.47                                | C0805C474_5RAC    | 50      | K, M                  | 1.00 (.040) $\pm$ 0.10 (.004) | 2,500       | 10,000       |
| 0.68                                | C0805C684_5RAC    | 50      | K, M                  | 1.25 (.049) $\pm$ 0.20 (.008) | 3,000       | 10,000       |
| 1                                   | C1206C105_5RAC    | 50      | K, M                  | 1.00 (.040) $\pm$ 0.10 (.004) | 2,500       | 10,000       |
| 2.2                                 | C1206C225_3RAC    | 25      | K, M                  | 1.20 (.047) $\pm$ 0.15 (.006) | 2,500       | 10,000       |
| 2.2                                 | C1206C225_5RAC    | 50      | K, M                  | 1.60 (.063) $\pm$ 0.20 (.008) | 2,000       | 8,000        |
| 4.7                                 | C1206C475_3RAC    | 25      | K, M                  | 1.60 (.063) $\pm$ 0.20 (.008) | 2,000       | 8,000        |
| 10                                  | C1210C106_4RAC    | 16      | K, M                  | 1.55 (.061) $\pm$ 0.15 (.006) | 2,000       | 8,000        |
| 10                                  | C1210C106_8RAC    | 10      | K, M                  | 1.55 (.061) $\pm$ 0.15 (.006) | 2,000       | 8,000        |
| 10                                  | C1210C106_9RAC    | 6.3     | K, M                  | 1.55 (.061) $\pm$ 0.15 (.006) | 2,000       | 8,000        |
| 2.2                                 | C1210C225_5RAC    | 50      | K, M                  | 1.25 (.049) $\pm$ 0.15 (.006) | 2,500       | 10,000       |
| 3.3                                 | C1210C335_5RAC    | 50      | K, M                  | 1.70 (.067) $\pm$ 0.20 (.008) | 2,000       | 8,000        |
| 4.7                                 | C1210C475_3RAC    | 25      | K, M                  | 1.25 (.049) $\pm$ 0.15 (.006) | 2,500       | 10,000       |
| 4.7                                 | C1210C475_4RAC    | 16      | K, M                  | 0.90 (.035) $\pm$ 0.10 (.004) | 4,000       | 10,000       |
| 4.7                                 | C1210C475_8RAC    | 10      | K, M                  | 0.90 (.035) $\pm$ 0.10 (.004) | 4,000       | 10,000       |
| 4.7                                 | C1210C475_9RAC    | 6.3     | K, M                  | 0.90 (.035) $\pm$ 0.10 (.004) | 4,000       | 10,000       |

#### Electrical Parameters

As detailed in the KEMET Surface Mount Catalog F3102 for X7R, with the following specific requirements based on room temperature (25°C) parameters:

- Operating Range: -55°C to +125°C, with no-bias capacitance shift limited to the  $\pm$  15% over that range.
- Insulating Resistance (IR) measured after 2 minutes at rated voltage @25°C: Limit is 500 megohm-microfarads or 10,000M $\Omega$ , whichever of the two is smaller.
- Capacitance and Dissipation Factor (DF) are measured under the following conditions:  
1kHz and 1 Vrms if capacitance  $\leq$  10 $\mu\text{F}$   
120Hz and 0.5 Vrms if capacitance > 10 $\mu\text{F}$
- DF limits:  
50 -200 Volts — 2.5%  
16 -25 Volts — 3.5%  
6.3 / 10 Volts — 5.0%

#### Soldering Process

All parts incorporate the standard KEMET barrier layer of pure nickel, with an overplate of pure tin to provide excellent solderability as well as resistance to leaching. The recommended mounting techniques are as follows:

- 0402 / 1210 case sizes — Solder Reflow
- 0603 / 0805 / 1206 case sizes — Solder Wave / Solder Reflow

#### Marking

These chips will be supplied unmarked. If required, they can be laser-marked as an extra option. Details on the marking format are included in KEMET Surface Mount catalog F3102.

***In general, the information provided in the KEMET Surface Mount catalog F3102 applies to these capacitors. The information in this bulletin supplements that in the catalog***



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